

## ABSTRACT

~~— An object is to provide a small-diameter speaker capable of reproducing low frequency sounds without distortion and sounds faithful to input signals.~~

iii. ~~— A speaker 30 included in a speaker unit 20 has a conical diaphragm 42. An end of a circular cylindrical wall member 54 is secured to the large diameter end of the diaphragm 42. The inner surface of the wall member 54 is arranged parallel to a direction in which the diaphragm 42 vibrates. Audio signals inputted to a voice coil 52 cause the diaphragm 42 and the wall member 54 to vibrate in a direction substantially orthogonal to a surface 22a of a cabinet 22. This causes air in front of the diaphragm 42 to be compressed and then released. A shock that occurs when the compressed air is released propagates and is perceived as sound. The wall member vibrates along with the vibration of the diaphragm.~~

9. The speaker unit according to Claim 9, wherein the inner surface of the at least one wall member is arranged substantially parallel to the vibration direction of the diaphragm.

10. The speaker unit according to Claim 9, wherein the at least one wall member includes a frame surrounding the sound-wave emission side of the diaphragm.

11. The speaker unit according to Claim 9, wherein the at least one wall member has a cross-sectional shape that is substantially the same as a shape of a rim of the sound-wave emission surface of the diaphragm.

12. The speaker unit according to Claim 9, wherein the at least one wall member includes a plurality of wall members that are arranged concentrically with respect to a center of the diaphragm.

13. The speaker unit according to Claim 9, wherein a height of the at least one wall member is substantially the same as a maximum amplitude of the diaphragm.

14. The speaker unit according to Claim 9, wherein the cabinet has a substantially rectangular box-shaped configuration.

15. A speaker unit comprising:  
a cabinet including a surface having an opening therein;  
a speaker attached to an inner side of the surface and aligned

with the opening; wherein

the speaker includes:

iv. a diaphragm arranged to vibrate in a direction  
extending along a surface of the speaker so as to  
emit sound waves in a vibration direction of the  
diaphragm; and

v. a plurality of tubular elements touching and  
arranged side by side on a sound-wave emission  
side of the diaphragm, each of the plurality of  
tubular elements having an inner surface extending  
substantially parallel to a vibration direction of  
the diaphragm; wherein

vi. the plurality of tubular elements and the  
diaphragm are secured to each other, and the  
plurality of tubular elements vibrate along with  
the vibration of the diaphragm.

16. The speaker unit according to Claim 16, wherein a  
height of each of the plurality of tubular elements is  
substantially the same as a maximum amplitude of the  
diaphragm.

17. The speaker unit according to Claim 16, wherein the  
cabinet has a substantially rectangular box-shaped  
configuration.

## ABSTRACT OF THE DISCLOSURE

A speaker included in a speaker unit has a conical diaphragm. An end of a substantially circular cylindrical wall member is secured to the large-diameter end of the diaphragm. The inner surface of the wall member is arranged substantially parallel to a direction in which the diaphragm vibrates. Audio signals input to a voice coil cause the diaphragm and the wall member to vibrate in a direction that is substantially perpendicular to a surface of a cabinet. This causes air in front of the diaphragm to be compressed and then released. A shock that occurs when the compressed air is released propagates and is perceived as sound. The wall member<sup>54</sup> prevents leakage of the compressed air from the front to the side of the diaphragm<sup>42</sup>.